What is claimed is:

1. A diagnostic agent comprising an aminocarboxylate ligand complexed with a paramagnetic metal ion wherein a nitrogen atom within said aminocarboxylate is substituted with a substituted aromatic amide group.

2. The diagnostic agent of claim 1 wherein said substituted aromatic amide group is of the formula

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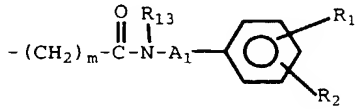


wherein

A_1 is $-(CH_2)_{m'}-$ or a single bond;

$(CH_2)_m$ and $(CH_2)_{m'}$ may independently be substituted with alkyl or hydroxyalkyl;

R_1 and R_2 are each independently hydrogen, alkyl, $-NO_2$, $-NH_2$, $-NHC(=S)NHR_{12}$, NCS, $-C(=O)-NR_3R_4$, NR_3COR_9 where R_9 is alkyl or hydroxyalkyl, with the proviso that at least one of R_1 and R_2 must be other than hydrogen;

R_3 and R_4 are independently hydrogen, alkyl, arylalkyl, aryl, alkoxy and hydroxyalkyl;

R_{12} is hydrogen, alkyl or hydroxyalkyl;

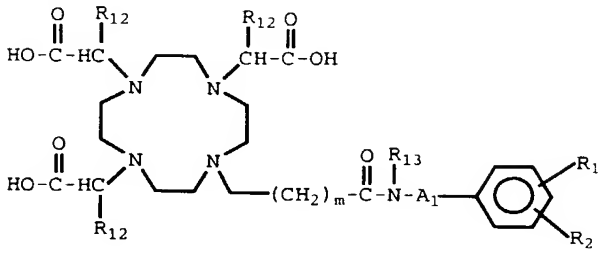
R_{13} is hydrogen, alkyl, arylalkyl, aryl, alkoxy or hydroxyalkyl;

m and m' are independently 1 to 5;

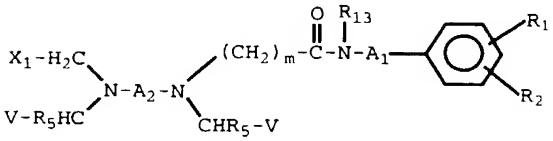
and multimeric forms thereof.

3. A diagnostic agent of claim 2 wherein said ligand is of the formula

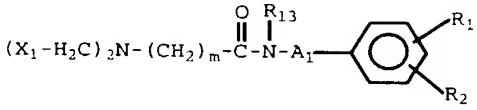
Ia



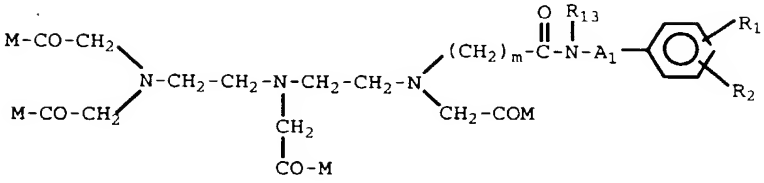
Ib



Ic



Id



wherein m, R_{13}, A_1, R_1, R_2, and R_{12} are as defined in claim 2 and wherein

X_1 is $-COOY_1$, PO_3HY_1 or $-CONHOY_1$;

Y_1 is a hydrogen atom, a metal ion equivalent and/or a physiologically biocompatible cation of an inorganic or organic base or amino acid;

A_2 is $-CHR_6-CHR_7-$, $-CH_2CH_2(ZCH_2-CH_2)_n-$, $-CH_2-\underset{\displaystyle N(CH_2X_1)_2}{\underset{|}{CH}}-CH_2-$ or $-CH_2-CH_2-\underset{\displaystyle CH_2-CH_2-N(CH_2X_1)_2}{\underset{|}{N}}-CH_2-CH_2-$, wherein X_1 is as defined above;

each R_5 is hydrogen or methyl;

R_6 and R_7 together represent a trimethylene group or a tetramethylene group or individually are hydrogen atoms, lower alkyl groups (e.g., 1-8 carbons), phenyl groups, benzyl groups or R_6 is a hydrogen atom and R_7 is $-(CH_2)_p-C_6H_4-W-$protein where p is 0 or 1, W is -NH-, $-NHCOCH_2-$ or -NHCS-, protein represents a protein residue;

n is 1, 2 or 3;

Z is an oxygen atom or a sulfur atom or the group NCH_2X_1 or $NCH_2CH_2OR_8$ wherein X_1 is as defined above and R_8 is C_{1-8}alkyl;

V is X_1 or is $-CH_2OH$, $-CONH(CH_2)_rX_1$ or -COB, wherein X_1 is as defined above, B is a protein or lipid residue, r is an integer from 1 to 12, or if R_5, R_6 and R_7 are each hydrogen; then both V's together form the group

$$-(CH_2)_w-\underset{\displaystyle CH_2X_1}{\underset{|}{N}}-CH_2-CH_2-\underset{\displaystyle CH_2X_1}{\underset{|}{N}}-(CH_2)_w-$$

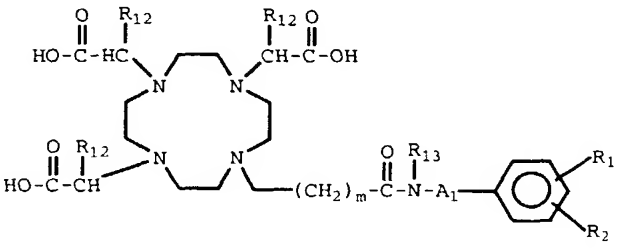
where X_1 is as above, w is 1, 2 or 3, provided that at least two of the substituents Y_1 represent metal ion equivalents of an element with an atomic number of 21 to 29, 42, 44 or 57 to 83; from 1 to 4, advantageously 2 or 3, and preferably 2 M's are -OH and the balance independently are $-OR_{10}$, $-NH_2$,

$-NHR_{10}$ and/or $NR_{10}R_{10}'$ wherein R_{10} and R_{10}' are selected from an organic alkyl radical of up to 18 carbon atoms which may be substituted.

4. The diagnostic agent of claim 1 wherein said paramagnetic metal ion is gadolinium.

5. A compound of formula Ia, Ib, Ic or Id as defined in claim 3, including multimers thereof.

6. A compound of the formula



wherein

A_1 is $-(CH_2)_m'-$ or a single bond;

$(CH_2)_m$ and $(CH_2)_m'$ may independently be substituted with alkyl or hydroxyalkyl;

R_1 and R_2 are each independently hydrogen, alkyl, $-NO_2$, $-NH_2$, $-NHC(=S)NHR_{12}$, NCS, $-C(=O)-NR_3R_4$ and NR_3COR_9 where R_9 is alkyl or hydroxyalkyl, with the proviso that at least one of R_1 and R_2 must be other than hydrogen;

R_3 and R_4 are independently hydrogen, alkyl, arylalkyl, aryl, alkoxy and hydroxyalkyl;

R_{12} is hydrogen, alkyl or hydroxyalkyl;

R_{13} is hydrogen, alkyl, arylalkyl, aryl, alkoxy or hydroxyalkyl;

m and m' are independently 1 to 5;

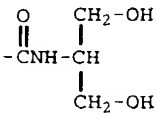
and multimeric forms thereof.

7. A compound of claim 6 wherein R_1 and R_2 are each $-\overset{O}{\overset{\|}{C}}-NR_3R_4$ wherein each R_3 group is hydroxyalkyl.

8. A compound of claim 6 wherein R_1 and R_2 are each $-\overset{O}{\overset{\|}{C}}-NR_3R_4$ wherein each R_3 group is selected from $-CH_2-\underset{OH}{\underset{|}{CH}}-CH_2OH$ and $-CH(CH_2OH)_2$, and wherein each R_4 group is hydrogen.

9. A compound of claim 6 wherein R_1 and R_2 are each $-\overset{O}{\overset{\|}{C}}NHCH_2-\underset{OH}{\underset{|}{CH}}-CH_2-OH$.

10. A compound of claim 6 wherein R_1 and R_2 are each



11 A compound of claim 6 having the name 10-[2-[[3,5-bis[[(2,3-dihydroxypropyl)amino]-carbonyl]phenyl]amino]-2-oxoethyl]-1,4,7,10-tetraazacyclododecane-1,4,7-triacetic acid.

12. The gadolinium complex of the compound of claim 11.

13. A compound of claim 6 having the name 10-[2-[[3,5-bis-[[[2-hydroxy-1-(hydroxymethyl)-ethyl]amino]carbonyl]phenylamino]2-oxoethyl]-1,4,7,10-tetraazacyclododecane-1,4,7-triacetic acid.

14. The gadolinium complex of the compound of claim 13.

15. A compound of claim 6 having the name 10-[2-[methyl[3,5-bis[[(2-methylbutyl)amino]-

carbonyl]phenyl]amino]-2-oxoethyl]-1,4,7,10-tetraazacyclododecane-1,4,7-triacetic acid.

16. The gadolinium complex of the compound of claim 15.

17. A compound of claim 6 having the name 10-[2-[[4-[[2,3-dihydroxypropyl)amino]carbonyl]-phenyl]amino]-2-oxoethyl-1,4,7,10-tetraazacyclododecane-1,4,7-triacetic acid.

18. The gadolinium complex of the compound of claim 17.

19. A compound of claim 6 having the name 10-[N-(4-nitrophenyl)acetamido]-1,4,7,10-tetraazacyclododecane-1,4,7-triacetic acid.

20. The gadolinium complex of the compound of claim 19.

21. A compound of claim 6 having the name 10-[N-(4-aminophenyl)acetamido]-1,4,7,10-tetraazacyclododecane-1,4,7-triacetic acid.

22. The gadolinium complex of the compound of claim 21.

23. A compound of claim 6 having the name 10-[[N-(4-(N'-isothiocyanato)phenyl]acetamido]]-1,4,7,10-tetraazacyclododecane-1,4,7-triacetic acid.

24. The gadolinium complex of the compound of claim 23.

25. A compound of claim 6 having the name 10-[N-[4-(N'-methylthioureido)phenyl]acetamido]-1,4,7,10-tetraazacyclododecane-1,4,7-triacetic acid.

26. The gadolinium complex of the compound of claim 25.

27. A compound of claim 6 having the name 10-[N-[4-(N',N'-diethylaminothioureido)phenyl]-acetamido]-1,4,7,10-tetraazacyclododecane-1,4,7-triacetic acid.

28. The gadolinium complex of the compound of claim 27.

29. A compound of claim 6 having the name 10,10'[[[[[(1,2-ethanediyl)diimino]bis(thioxomethyl)-diimino]bis(4,1-phenylene)]diimino-bis[1,4,7,10-tetraazacyclododecane-1,4,7-triacetic acid].

30. The gadolinium complex of the compound of claim 29.

31. A compound of claim 6 having the name 10,10'-[[[[(Thioxomethyl)bis(imino)bis(4,1-phenylene)]bis(imino)]bis(2-oxo-2,1-ethanediyl)]-1,4,7,10-tetraazacyclododecane-1,4,7-triacetic acid.

32. The gadolinium complex of the compound of claim 31.

33. A compound of claim 6 having the name 10,10',10''-[[[[[[iminobis(2,1-ethanediyl)triimino]-tris(thioxomethyl)]-triimino]tris-(4,1-phenylene)]-triimino]tris(2-oxo-2,1-ethanediyl)]tris[1,4,7,10-tetraazacyclododecane-1,4,7-triacetic acid].

34. The gadolinium complex of the compound of claim 33.

35. A compound of claim 6 having the name 10-[2-[[2-(4-nitrophenyl)ethyl]amino]-2-oxoethyl]-1,4,7,10-tetraazacyclododecane-1,4,7-triacetic acid.

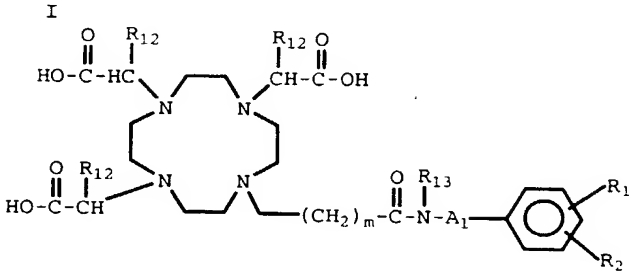
36. The gadolinium complex of the compound of claim 35.

37. A compound of claim 6 having the name 10-[2-[[3,5-bis[[(2-hydroxyethyl)amino]-carbonyl]-phenyl]amino]-2-oxoethyl]-1,4,7,10-tetra-azacyclododecane-1,4,7-triacetic acid, monosodium salt.

38. The gadolium complex of the compound of claim 37.

39. A complex, or a pharmaceutically acceptable salt of a complex, of a metal atom and a metal chelating ligand having the formula

I



wherein

A_1 is $-(CH_2)_{m'}-$ or a single bond;

$(CH_2)_m$ and $(CH_2)_{m'}$ may independently be substituted with alkyl or hydroxyalkyl;

R_1 and R_2 are each independently hydrogen, alkyl, $-NO_2$, $-NH_2$, $-NHC(=S)NHR_{12}$, NCS, $-C(=O)-NR_3R_4$ and NR_3COR_9 where R_9 is alkyl or hydroxyalkyl, with the proviso that at least one of R_1 and R_2 must be other than hydrogen;

R_3 and R_4 are independently hydrogen, alkyl, arylalkyl, aryl, alkoxy and hydroxyalkyl;

R_{12} is hydrogen, alkyl or hydroxyalkyl;

R_{13} is hydrogen, alkyl, arylalkyl, aryl, alkoxy or hydroxyalkyl;

m and m' are independently 1 to 5;

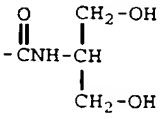
and multimeric forms thereof.

40. A complex of claim 39 wherein R_1 and R_2 are each $-C(=O)-NR_3R_4$ wherein each R_3 group is hydroxyalkyl.

41. A complex of claim 39 wherein R_1 and R_2 are each $-\overset{O}{\overset{\|}{C}}-NR_3R_4$ wherein each R_3 group is selected from $-CH_2-\overset{OH}{\overset{|}{C}}H-CH_2-OH$ and $-CH(CH_2OH)_2$, and wherein each R_4 group is hydrogen.

42. A complex of claim 39 wherein R_1 and R_2 are each $-\overset{O}{\overset{\|}{C}}NHCH_2-\overset{OH}{\overset{|}{C}}H-CH_2-OH$

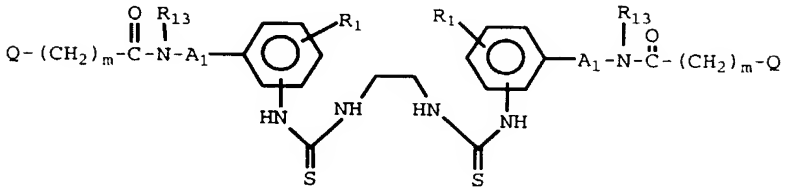
43. A complex of claim 39 wherein R_1 and R_2 are each

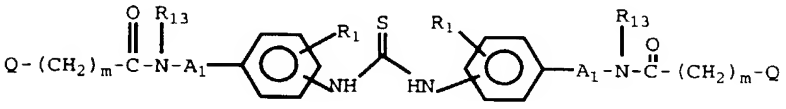


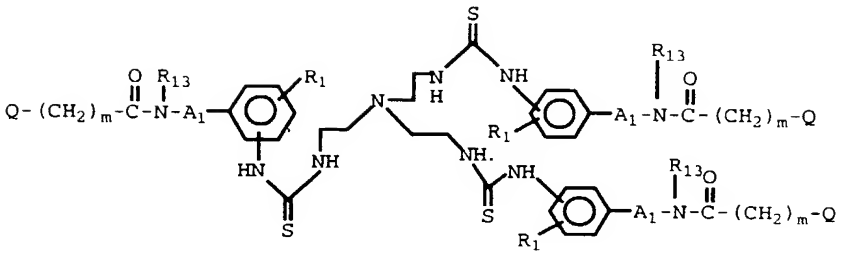
44. A complex of claim 39 wherein said metal atom is of atomic number 56-83.

45. A complex of claim 39 wherein said metal is gadolinium(III).

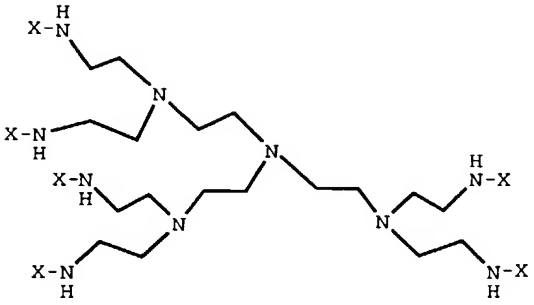
46. A multimer selected from



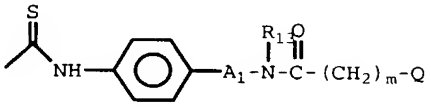




or



where X =



and wherein Q is an aminocarboxylate ligand and the other variables are as defined in claim 3.

47. A compound of claim 6 having the name 10-[2-[[3,5-bis[[(2-methylbutyl)amino]carbonyl]-phenyl]amino]2-oxoethyl]1,4,7,10-tetraazacyclo-dodecane-1,4,7-triacetic acid.

48. The gadolinium complex of the compound of claim 47.

49. A compound of claim 6 having the name 10,10',10'',10''',10'''',10'''''-[[[[[[[[(Nitrilo-

tri-2,1-ethanediyl)tris(nitrilo)]hexakis-(2,1-ethanediyl)]hexakis(imino)hexakis-(carbonothioyl)]hexakis-(imino)]hexakis-(4,1-phenylene)]hexakis-(imino)]-hexakis-(2-oxo-2,1-ethanediyl)]hexakis[1,4,7,10-tetraazacyclododecane-1,4,7-triacetic acid].

50. The gadolinium complex of the compound of claim 49.